

NISTTech

Recirculating Temperature Wave Focusing Chromatography

Perform ultra-sensitive chromatographic chemical analysis and detect trace chemicals from complex samples

Description

This method uses a circulating temperature “wave” that sweeps up and focuses the chemical compounds from a sample in a chromatography column loop. Some compounds ride high and others ride low on the wave, so different compounds can be separated and individually measured. The shape of the wave can be manipulated in real time by the instrument user. For example, multiple, repeated (or even continuous) sample injections may be swept up together to form a single set of chromatographic peaks for ultra-high sensitivity measurements. High concentration background compounds can be selectively removed from the wave so that trace chemicals can be quantitatively measured even from very complex and difficult samples. Also, the ability to resolve or distinguish similar compounds can be adjusted on- the- fly as the focused compounds are circulated, giving unprecedented capabilities for analysis and discovery of novel compounds. This invention can be applied to a very wide range of problems where chromatographic methods are needed for trace analysis and/ or for use with complex samples.

Applications

- **Biology & Medicine**
- **Petrochemical Refining & Manufacturing**
- **Semiconductor Manufacturing**

Advantages

- **Ultra-sensitive**
Chemical compounds are isolated and focused on the wave for individual separation and measurement
- **Widely applicable**
Covers a wide range of chemicals and concentrations

Abstract

The invention is a device and method for performing chromatography in an equilibrium gradient focusing mode rather than a transient, migration-based mode.

The present invention utilizes temperature gradient focusing (TGF) for a wide array of chromatography applications. The invention is based upon a discovery that by recirculating a moving temperature wave through a system preferably comprising two or more chromatography columns, analytes accumulate at select locations on the temperature wave. Thus, analyte peaks become narrower and more intense as the temperature wave is circulated about the system. The resulting focusing of analyte peaks enables higher resolution and lower detection limits for the system.

Inventors

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Related Items

- MERWYN Business Simulation Report

References

- U.S. Patent Application #20090320560
- Docket: 08-024

Status of Availability

This invention is available for licensing.

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